

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1-3, 5, 7-8, 10, 12-13 and 15-18 are currently being amended.

Claims 20-25 are being added.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-25 are now pending in this application.

Interview Summary

Applicants thank the Examiner for the brief interview with Applicants' Representative on August 17, 2007. Applicants note the typographical error in the Interview Summary noting a July 17 interview date.

The interview included a discussion of the claim rejections under 35 U.S.C. 112, second paragraph. Applicants' Representative agrees that the Interview Summary mailed August 23, 2007 summarizes the Examiner's position as discussed during the interview. Applicants do not agree with the content of many of the statements, including: the characterization of Applicants' own specification; the implication that claims sweeping broadly are a problem; and that the words "local" and "remote" are nebulous in view of the specification.

Claim Rejections Under 35 U.S.C. §112

Claims 1-3, 7, 8, 12, 13 and 15-18 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. While Applicant disagrees that the previous terms were indefinite in view of the application as a whole, Applicant has amended the claims in order to overcome the concerns raised in the rejection.

Claim Rejections Under 35 U.S.C. §102 & 103

Claims 1-3 are rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Bizzell et al (USP 4,470,450). Applicants traverse this rejection.

Bizzell involves a pump-assisted heat pipe, but does not appear to involve a structure having a testhead, such as a testhead found in the automated test equipment field. Claim 1 now recites an evaporator coupled to the electronic assembly that is located on the testhead, which is not disclosed or suggested by Bizzell.

Claim 2 is patentable at least by way of its dependency from claim 1. Claim 2 is also patentable because Bizzell does not teach or suggest a pump disposed off of the testhead, with the testhead, evaporator and condenser being in movable relation to the pump.

Claim 3 is patentable at least by way of its dependency from claim 1. Claim 3 is also patentable because Bizzell does not teach or suggest either a single-phase liquid coolant inlet or outlet line extending on and off of the testhead, as recited in detail in claim 3.

Claims 1-3, 5-8, 10-18 are rejected under 35 U.S.C. §103(a) as being unpatentable over the combined teaching of Bizzell (USP 4,470,450) and Nelson et al (USP 4,118,756). Applicants traverse this rejection.

Nelson involves a heat pipe thermal mounting plate. Nelson discloses the use of capillary action for pumping purposes (see col. 4, beginning at line 35) and would therefore appear to be incompatible with the motivation to be combined with the pump of Bizzell as asserted in the Office Action. Also, it is unclear where a need for “essentially uniform cooling” is desired, as this appears to be similar to the conventional liquid cooling modules and cold plates discussed in the first two paragraphs of page 2 of Applicants disclosure. Such a configuration can provide too low of a heat transfer rate, absent the larger coolant volume flow rates and larger pumps that are undesirable for the small footprint sought with electronic systems. As also noted in Applicants’ disclosure, alternatively, decreasing the system pressure drop by increasing the plumbing sizes also negatively affects the system and card-cage packaging. In view of the above, Applicants assert that Bizzell and Nelson are not properly combinable

Even if Bizzell and Nelson are combined, Nelson does not overcome the deficiencies noted above regarding claims 1-3. Regarding claim 5, Applicants submit that Bizzell and Nelson do not suggest pumping a single-phase liquid coolant onto a testhead or routing the condensed single-phase liquid coolant off the testhead. Claim 6 is patentable at least by way of its dependency from claim 5.

Regarding claim 7, Applicants submit that Bizzell and Nelson do not suggest an evaporator located on a testhead. Claim 8 is patentable at least by way of its dependency from claim 5. Claim 8 is also patentable because Bizzell and Nelson do not suggest a local condenser disposed on the testhead.

Regarding claim 10 Bizzell and Nelson do not suggest means for pumping a single-phase liquid coolant onto a testhead. Claims 11-15 are patentable at least by way of their dependency from claim 10.

Regarding claim 16, Bizzell and Nelson do not suggest a plurality of cooling assemblies located on a mobile testhead. Claim 17 is patentable at least by way of its dependency from claim 16 and also because Bizzell and Nelson do not suggest the plurality of cooling assemblies,

evaporator and condenser are movable in relation to the pump. Claims 17-18 are patentable at least by way of their dependency from claim 16.

Claims 1-3, 5-8, 10-18 are rejected under 35 U.S.C. §103(a) as being unpatentable over the combined teachings of Bizzell (USP 4,470,450) and Malhammar et al (USP 5,966,957). Applicants traverse this rejection.

Malhammar is directed to the use of evaporators connected in series to increase pumping action through the cooling system and permit one or more evaporators to be situated above the condenser liquid level to increase the condenser placement options. See the Abstract and Summary of Malhammar. As with Nelson, the Office Action again seeks to combine the fluid pump 11 of Bizzell with a reference directed toward eliminating the pump. Therefore, Applicants assert Bizzell and Malhammar are not properly combinable. Even if combined, Malhammar does not overcome the deficiencies noted above regarding Bizzell and claims 1-3 and the combination of Bizzell and Nelson regarding claims 1-3, 5-8 and 10-18.

Claims 1-3, 5-8, 10-18 are rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Mizuno et al (USP 5,522,452). Applicants traverse this rejection.

The Office Action references Figure 7 of Mizuno, which is directed to the concept of agitation of coolant by the use of “section pipes 36 to suck in bubbles produced on and floating over heat sinks 3 to heat exchanger 11 together with liquid coolant. Heat exchanger 11 cools down the coolant and recirculates it into the housing 5...” see col 4, lines 4-8.

Figure 7 of Mizuno does not appear to involve a structure having a testhead, such as a testhead found in the automated test equipment field. Claim 1 recites an evaporator coupled to

the electronic assembly that is located on the testhead, which is not taught or suggested by Mizuno.

Claim 2 is patentable at least by way of its dependency from claim 1. Claim 2 is also patentable because Mizuno does not teach or suggest a pump disposed off of the testhead, with the testhead, evaporator and condenser being in movable relation to the pump.

Claim 3 is patentable at least by way of its dependency from claim 1. Claim 3 is also patentable because Mizuno does not teach or suggest either a single-phase liquid coolant inlet or outlet line extending on and off of the testhead, as recited in detail in claim 3.

Regarding claim 5, Applicants submit that Mizuno does not teach or suggest pumping a single-phase liquid coolant onto a testhead or routing the condensed single-phase liquid coolant off the testhead. Claim 6 is patentable at least by way of its dependency from claim 5.

Regarding claim 7, Applicants submit that Mizuno does not teach or suggest an evaporator located on a testhead. Claim 8 is patentable at least by way of its dependency from claim 5. Claim 8 is also patentable because Mizuno does not teach or suggest a local condenser disposed on the testhead.

Regarding claim 10 Mizuno does not teach or suggest means for pumping a single-phase liquid coolant onto a testhead. Claims 11-15 are patentable at least by way of their dependency from claim 10.

Regarding claim 16, Mizuno does not teach or suggest a plurality of cooling assemblies located on a mobile testhead. Claim 17 is patentable at least by way of its dependency from claim 16 and also because Mizuno does not teach or suggest the plurality of cooling assemblies, evaporator and condenser are movable in relation to the pump. Claims 17-18 are patentable at least by way of their dependency from claim 16.

Claims 1-3, 5-8, 10-18 are rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Chu (USP 3,586, 101). Applicants traverse this rejection.

Chu involves a cooling system in which cooling liquid circulates by gravitational force. See the Abstract of Chu.

Chu does not appear to involve a structure having a testhead, such as a testhead found in the automated test equipment field. Claim 1 recites an evaporator coupled to the electronic assembly that is located on the testhead, which is not taught or suggested by Chu.

Claim 2 is patentable at least by way of its dependency from claim 1. Claim 2 is also patentable because Chu does not teach or suggest a pump disposed off of the testhead, with the testhead, evaporator and condenser being in movable relation to the pump.

Claim 3 is patentable at least by way of its dependency from claim 1. Claim 3 is also patentable because Chu does not teach or suggest either a single-phase liquid coolant inlet or outlet line extending on and off of the testhead, as recited in detail in claim 3.

Regarding claim 5, Applicants submit that Chu does not teach or suggest pumping a single-phase liquid coolant onto a testhead or routing the condensed single-phase liquid coolant off the testhead. Claim 6 is patentable at least by way of its dependency from claim 5.

Regarding claim 7, Applicants submit that Chu does not teach or suggest an evaporator located on a testhead. Claim 8 is patentable at least by way of its dependency from claim 5. Claim 8 is also patentable because Chu does not teach or suggest a local condenser disposed on the testhead.

Regarding claim 10 Chu does not teach or suggest means for pumping a single-phase liquid coolant onto a testhead. Claims 11-15 are patentable at least by way of their dependency from claim 10.

Regarding claim 16, Chu does not teach or suggest a plurality of cooling assemblies located on a mobile testhead. Claim 17 is patentable at least by way of its dependency from claim 16 and also because Chu does not teach or suggest the plurality of cooling assemblies, evaporator and condenser are movable in relation to the pump. Claims 17-18 are patentable at least by way of their dependency from claim 16.

Claims 1-3, 5-8, 10-18 are rejected under 35 U.S.C. §103(a) as being unpatentable over the combined teachings of Mizuno et al (USP 5,522,452) and Chu et al (USP 3,586,101). Applicants traverse this rejection, as neither Mizuno nor Chu contains all the limitations of the rejected claims, as noted above. Nor does their combination teach or suggest the missing items discussed above.

Newly-added claims 20-25 are directed to the first species and are patentable at least by way of their dependencies from claims 1, 5 or 10.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is reminded that claims 5, 7 and 10 were determined to be generic to all species.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37

C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-741.

Respectfully submitted,
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